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Gold nanoparticles embedded into porous matrices: structural and electronic properties

Noble metal nanoparticles (NPs) play an important role in modern catalysis. Embedded into metal organic frameworks MOFs, they are part of the new branch of hybrid materials having been studied with the scope of applications in the fields of heterogeneous catalysis and hydrogen storage. The scope here is to achieve a highly loaded porous material with cavity-size matching NPs and well defined spatial and homogeneous size dispersion. The preparation methods include solvothermal and microwave synthesis of Metal-Organic framework [1]. The focus is on zeolitic imidazole frameworks ZIFs, which have a structure similar to that of zeolites, specifically ZIF-8 embedded with gold NPs. The latter obtained via solvothermal synthesis of gold NPs using a modified Turkevich method[2]. The hybrid material is obtained via core shell synthesis. The materials obtained have been characterized with UV-Vis and IR spectroscopies .
The work presented here employs a number of different synthesis method in order to find the most efficient, green and with the maximum loading of the pores in gold. Furthermore, we aim to characterize the material at the core shell boundary, to understand the interactions binding the ZIF with the NP. As well as the potential applications of the obtained hybrid material in the field of catalysis.

References

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